Primers for LIC cloning:

Upstream: add TACTTCCAATCCAT*G* to the 5’ end (ATG in-frame with the desired coding sequence).

Downstream: add TATCCACCTTTACTG to 5’ end of downstream primer; add termination codon, if necessary.

Coding dna sequence

TACTTCCAATCCATGAAAAAAACCTTCCTGATCGCGCTGGTGCTGGCGACCTCTCTGATCGGTGCGGAGAAC

GCCAAATGGGACTACAAAAACAAAGAGAATGGTCCTCACCGTTGGGACAAACTGCACAAA

GACTTTGAAGTATGCAAGTCTGGTAAATCTCAGTCTCCGATCAACATCGAACACTACTAT

CACACCCAGGACAAAGCGGACCTGCAGTTCAAATACGCGGCGTCTAAACCGAAAGCGGTT

TTCTTCACCCACCACACCCTGAAAGCGTCTTTCGAACCGACCAACCACATCAACTACCGT

GGTCACGACTACGTTCTGGACAACGTTCACTTCCACGCGCCGATGGAATTTCTGATTAAC

AACAAAACCCGTCCGCTGTCTGCGCACTTCGTTCACAAGGACGCGAAAGGTCGTCTGCTG

GTTCTGGCAATCGGTTTCGAAGAAGGTAAAGAAAATCCTAACCTGGACCCGATCCTGGAA

GGTATCCAAAAGAAACAGAACTTTAAGGAAGTTGCGCTGGATGCGTTTCTCCCGAAATCT

ATCAATTACTACCACTTCAACGGCTCTCTCACGGCCCCTCCTTGCACCGAAGGTGTTGCG

TGGTTTGTTATCGAAGAGCCACTGGAGGTCTCTGCGAAACAGCTGGCGGAAATCAAAAAA

CGTATGAAGAACTCTCCGAACCAACGCCCGGTGCAGCCGGATTATAACACCGTTATCATC

AAATCTTCTGCAAAGACCCGTTAACAGTAAAGGTGGATA

Forward: (5🡪3)

TACTTCCAATCCATGAAAAAAACCTTCCTGATCGCG

Reverse: (5🡪3)

­TATCCACCTTTACTGTTAACGGGTCTTTGCAGAAGA

|  |  |  |
| --- | --- | --- |
|  | **Forward** | **Reverse** |
|  | TACTTCCAATCCATGAAAAAAACCTTCCTGATCGCG | TATCCACCTTTACTGTTAACGGGTCTTTGCAGAAGA |
| [Mg2+](mM) | Tm (oC) | Tm (oC) |
| 0.0 | 63.1 | 63.2 |
| 1.5 | 70.7 | 70.7 |
| 2.0 | 71.2 | 71.2 |
| 4.0 | 72.1 | 72.2 |
| 6.0 | 72.6 | 72.6 |

Full pnic28-bsa4 sequence

TAATACGACTCACTATAGGGGAATTGTGAGCGGATAACAATTCCCCTCTAGAAATAATTT

TGTTTAACTTTAAGAAGGAGATATACATATGCACCATCATCATCATCATTCTTCTGGTGT

AGATCTGGGTACCGAGAACCTGTACTTCCAATCCATGGAGACCGACGTCCACATATACCT

GCCGTTCACTATTATTTAGTGAAATGAGATATTATGATATTTTCTGAATTGTGATTAAAA

AGGCAACTTTATGCCCATGCAACAGAAACTATAAAAAATACAGAGAATGAAAAGAAACAG

ATAGATTTTTTAGTTCTTTAGGCCCGTAGTCTGCAAATCCTTTTATGATTTTCTATCAAA

CAAAAGAGGAAAATAGACCAGTTGCAATCCAAACGAGAGTCTAATAGAATGAGGTCGAAA

AGTAAATCGCGCGGGTTTGTTACTGATAAAGCAGGCAAGACCTAAAATGTGTAAAGGGCA

AAGTGTATACTTTGGCGTCACCCCTTACATATTTTAGGTCTTTTTTTATTGTGCGTAACT

AACTTGCCATCTTCAAACAGGAGGGCTGGAAGAAGCAGACCGCTAACACAGTACATAAAA

AAGGAGACATGAACGATGAACATCAAAAAGTTTGCAAAACAAGCAACAGTATTAACCTTT

ACTACCGCACTGCTGGCAGGAGGCGCAACTCAAGCGTTTGCGAAAGAAACGAACCAAAAG

CCATATAAGGAAACATACGGCATTTCCCATATTACACGCCATGATATGCTGCAAATCCCT

GAACAGCAAAAAAATGAAAAATATAAAGTTCCTGAGTTCGATTCGTCCACAATTAAAAAT

ATCTCTTCTGCAAAAGGCCTGGACGTTTGGGACAGCTGGCCATTACAAAACACTGACGGC

ACTGTCGCAAACTATCACGGCTACCACATCGTCTTTGCATTAGCCGGAGATCCTAAAAAT

GCGGATGACACATCGATTTACATGTTCTATCAAAAAGTCGGCGAAACTTCTATTGACAGC

TGGAAAAACGCTGGCCGCGTCTTTAAAGACAGCGACAAATTCGATGCAAATGATTCTATC

CTAAAAGACCAAACACAAGAATGGTCAGGTTCAGCCACATTTACATCTGACGGAAAAATC

CGTTTATTCTACACTGATTTCTCCGGTAAACATTACGGCAAACAAACACTGACAACTGCA

CAAGTTAACGTATCAGCATCAGACAGCTCTTTGAACATCAACGGTGTAGAGGATTATAAA

TCAATCTTTGACGGTGACGGAAAAACGTATCAAAATGTACAGCAGTTCATCGATGAAGGC

AACTACAGCTCAGGCGACAACCATACGCTGAGAGATCCTCACTACGTAGAAGATAAAGGC

CACAAATACTTAGTATTTGAAGCAAACACTGGAACTGAAGATGGCTACCAAGGCGAAGAA

TCTTTATTTAACAAAGCATACTATGGCAAAAGCACATCATTCTTCCGTCAAGAAAGTCAA

AAACTTCTGCAAAGCGATAAAAAACGCACGGCTGAGTTAGCAAACGGCGCTCTCGGTATG

ATTGAGCTAAACGATGATTACACACTGAAAAAAGTGATGAAACCGCTGATTGCATCTAAC

ACAGTAACAGATGAAATTGAACGCGCGAACGTCTTTAAAATGAACGGCAAATGGTACCTG

TTCACTGACTCCCGCGGATCAAAAATGACGATTGACGGCATTACGTCTAACGATATTTAC

ATGCTTGGTTATGTTTCTAATTCTTTAACTGGCCCATACAAGCCGCTGAACAAAACTGGC

CTTGTGTTAAAAATGGATCTTGATCCTAACGATGTAACCTTTACTTACTCACACTTCGCT

GTACCTCAAGCGAAAGGAAACAATGTCGTGATTACAAGCTATATGACAAACAGAGGATTC

TACGCAGACAAACAATCAACGTTTGCGCCTAGCTTCCTGCTGAACATCAAAGGCAAGAAA

ACATCTGTTGTCAAAGACAGCATCCTTGAACAAGGACAATTAACAGTTAACAAATAAAAA

CGCAAAAGAAAATGCCGATATCCTATTGGCATTGACGGTCTCCAGTAAAGGTGGATACGG

ATCCGAATTCGAGCTCCGTCGACAAGCTTGCGGCCGCACTCGAGCACCACCACCACCACC

ACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTG

AGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGA

AAGGAGGAACTATATCCGGATTGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGC

GGCGGGTGTGGTGGTTACGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGC

TCCTTTCGCTTTCTTCCCTTCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCT

AAATCGGGGGCTCCCTTTAGGGTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAA

ACTTGATTAGGGTGATGGTTCACGTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCC

TTTGACGTTGGAGTCCACGTTCTTTAATAGTGGACTCTTGTTCCAAACTGGAACAACACT

CAACCCTATCTCGGTCTATTCTTTTGATTTATAAGGGATTTTGCCGATTTCGGCCTATTG

GTTAAAAAATGAGCTGATTTAACAAAAATTTAACGCGAATTTTAACAAAATATTAACGTT

TACAATTTCAGGTGGCACTTTTCGGGGAAATGTGCGCGGAACCCCTATTTGTTTATTTTT

CTAAATACATTCAAATATGTATCCGCTCATGAATTAATTCTTAGAAAAACTCATCGAGCA

TCAAATGAAACTGCAATTTATTCATATCAGGATTATCAATACCATATTTTTGAAAAAGCC

GTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTTCCATAGGATGGCAAGATCCTGGT

ATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAACCTATTAATTTCCCCTCGTCAA

AAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGACTGAATCCGGTGAGAATGGCA

AAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCAGCCATTACGCTCGTCATCAA

AATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCGCCTGAGCGAGACGAAATA

CGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAATGCAACCGGCGCAGGAACA

CTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTCTTCTAATACCTGGAATG

CTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCAGGAGTACGGATAAAAT

GCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTCTGACCATCTCATCTG

TAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCTGGCGCATCGGGCT

TCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGCGAGCCCATTTAT

ACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCAAGACGTTTCCC

GTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACAGTTTTATTG

TTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAA

AAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGCAAACA

AAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCTTTTT

CCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAGCCG

TAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATC

CTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA

CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC

AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC

GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA

GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGG

TTTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTA

TGGAAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCT

CACATGTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAG

TGAGCTGATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAA

GCGGAAGAGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGC

ATATATGGTGCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACAC

TCCGCTATCGCTACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGA

CGCGCCCTGACGGGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTC

CGGGAGCTGCATGTGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCG

GTAAAGCTCATCAGCGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTC

CAGCTCGTTGAGTTTCTCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTT

AAGGGCGGTTTTTTCCTGTTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCAT

GGGGGTAATGATACCGATGAAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGA

ACATGCCCGGTTACTGGAACGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGA

CCAGAGAAAAATCACTCAGGGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCC

ACAGGGTAGCCAGCAGCATCCTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGA

CTTCCGCGTTTCCAGACTTTACGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCA

GGTCGCAGACGTTTTGCAGCAGCAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATT

CTGCTAACCAGTAAGGCAACCCCGCCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGAT

CATGCGCACCCGTGGGGCCGCCATGCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTT

GGTGGCGGGACCAGTGACGAAGGCTTGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAG

CGACAGGCCGATCATCGTCGCGCTCCAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAG

CGCTGCCGGCACCTGTCCTACGAGTTGCATGATAAAGAAGACAGTCATAAGTGCGGCGAC

GATAGTCATGCCCCGCGCCCACCGGAAGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCAT

CGGTCGAGATCCCGGTGCCTAATGAGTGAGCTAACTTACATTAATTGCGTTGCGCTCACT

GCCCGCTTTCCAGTCGGGAAACCTGTCGTGCCAGCTGCATTAATGAATCGGCCAACGCGC

GGGGAGAGGCGGTTTGCGTATTGGGCGCCAGGGTGGTTTTTCTTTTCACCAGTGAGACGG

GCAACAGCTGATTGCCCTTCACCGCCTGGCCCTGAGAGAGTTGCAGCAAGCGGTCCACGC

TGGTTTGCCCCAGCAGGCGAAAATCCTGTTTGATGGTGGTTAACGGCGGGATATAACATG

AGCTGTCTTCGGTATCGTCGTATCCCACTACCGAGATATCCGCACCAACGCGCAGCCCGG

ACTCGGTAATGGCGCGCATTGCGCCCAGCGCCATCTGATCGTTGGCAACCAGCATCGCAG

TGGGAACGATGCCCTCATTCAGCATTTGCATGGTTTGTTGAAAACCGGACATGGCACTCC

AGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATTGCGAGTGAGATATTTATGCCAGC

CAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGGGCCCGCTAACAGCGCGATTTGCT

GGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGCGTACCGTCTTCATGGGAGAAAA

TAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAAATAACGCCGGAACATTAGTGC

AGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGGATAGTTAATGATCAGCCCAC

TGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAGGCTTCGACGCCGCTTCGTT

CTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGCGAGATTTAATCGCCGCGA

CAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAACGCCAATCAGCAACGACT

GTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATTCAGCTCCGCCATCGCCG

CTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGTTCACCACGCGGGAAA

CGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGTTACTGGTTTCACAT

TCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGCGAAAGGTTTTGC

GCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTGCATTAGGAAG

CAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGGTGCATGCAAG

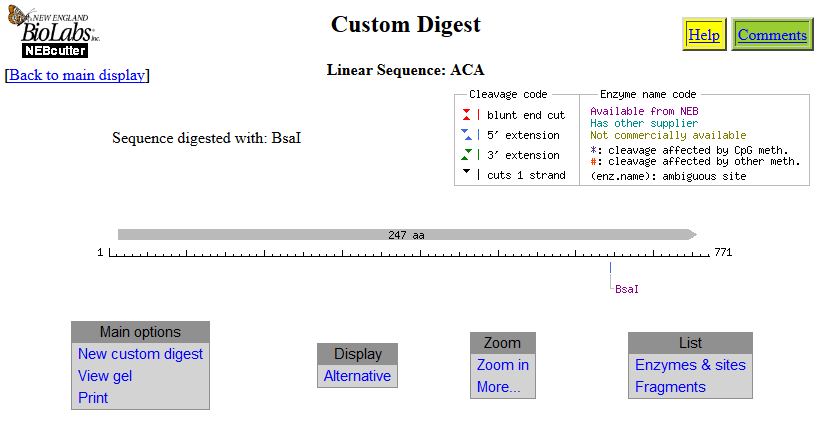
GAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCACGCCGAAACAA

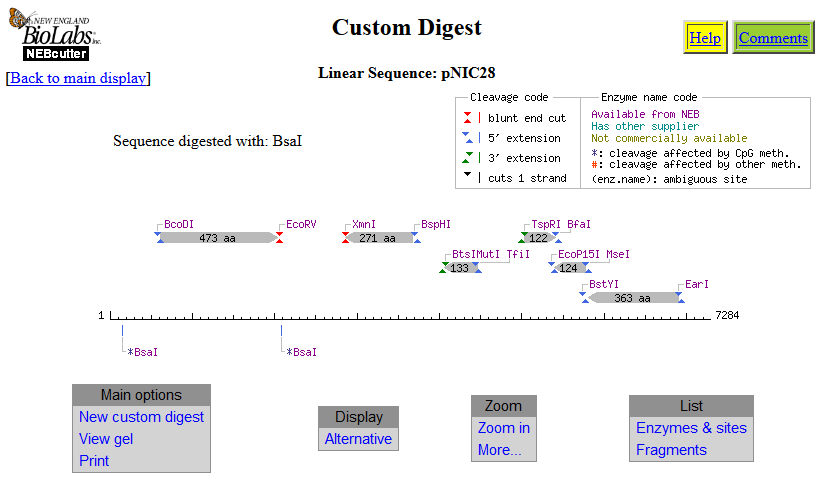
GCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCGGCGATATAG

GCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCGGCGTAGAGG

ATCGAGATCTCGATCCCGCGAAAT

Virtual Plasmid





TAATACGACTCACTATAGGGGAATTGTGAGCGGATAACAATTCCCCTCTAGAAATAATTT

TGTTTAACTTTAAGAAGGAGATATACATATG**CACCATCATCATCATCAT**TCTTCTGGTGT

AGATCTGGGTACCGAGAACCTGTACTTCCAATCCATGAAAAAAACCTTCCTGATCGCGCT

GGTGCTGGCGACCTCTCTGATCGGTGCGGAGAACGCCAAATGGGACTACAAAAACAAAGA

GAATGGTCCTCACCGTTGGGACAAACTGCACAAAGACTTTGAAGTATGCAAGTCTGGTAA

ATCTCAGTCTCCGATCAACATCGAACACTACTATCACACCCAGGACAAAGCGGACCTGCA

GTTCAAATACGCGGCGTCTAAACCGAAAGCGGTTTTCTTCACCCACCACACCCTGAAAGC

GTCTTTCGAACCGACCAACCACATCAACTACCGTGGTCACGACTACGTTCTGGACAACGT

TCACTTCCACGCGCCGATGGAATTTCTGATTAACAACAAAACCCGTCCGCTGTCTGCGCA

CTTCGTTCACAAGGACGCGAAAGGTCGTCTGCTGGTTCTGGCAATCGGTTTCGAAGAAGG

TAAAGAAAATCCTAACCTGGACCCGATCCTGGAAGGTATCCAAAAGAAACAGAACTTTAA

GGAAGTTGCGCTGGATGCGTTTCTCCCGAAATCTATCAATTACTACCACTTCAACGGCTC

TCTCACGGCCCCTCCTTGCACCGAAGGTGTTGCGTGGTTTGTTATCGAAGAGCCACTGGA

GGTCTCTGCGAAACAGCTGGCGGAAATCAAAAAACGTATGAAGAACTCTCCGAACCAACG

CCCGGTGCAGCCGGATTATAACACCGTTATCATCAAATCTTCTGCAAAGACCCGTTAACA

GTAAAGGTGGATACGGATCCGAATTCGAGCTCCGTCGACAAGCTTGCGGCCGCACTCGAG

CACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTG

GCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTG

AGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGATTGGCGAATGGGACGCGCCCTGTA

GCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCGCAGCGTGACCGCTACACTTGCCA

GCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTTTCTCGCCACGTTCGCCGGCT

TTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCCGATTTAGTGCTTTACGGC

ACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAGTGGGCCATCGCCCTGAT

AGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATAGTGGACTCTTGTTCC

AAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTATAAGGGATTTTGC

CGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTAACGCGAATTTTA

ACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGTGCGCGGAACCC

CTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATTAATTCTTAG

AAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTATCAATACCA

TATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTTCCATAGG

ATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAACCTATT

AATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGACTGAA

TCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCAGCCA

TTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCGCC

TGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAATGC

AACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTCT

TCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCA

GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT

CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAAC

TCTGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTA

TCGCGAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTA

GAGCAAGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAA

GCAGACAGTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGC

GTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAAT

CTGCTGCTTGCAAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGA

GCTACCAACTCTTTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGT

CCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATA

CCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTAC

CGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGG

TTCGTGCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCG

TGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAG

CGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCT

TTATAGTCCTGTCGGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTC

AGGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTT

TTGCTGGCCTTTTGCTCACATGTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCG

TATTACCGCCTTTGAGTGAGCTGATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGA

GTCAGTGAGCGAGGAAGCGGAAGAGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTG

CGGTATTTCACACCGCATATATGGTGCACTCTCAGTACAATCTGCTCTGATGCCGCATAG

TTAAGCCAGTATACACTCCGCTATCGCTACGTGACTGGGTCATGGCTGCGCCCCGACACC

CGCCAACACCCGCTGACGCGCCCTGACGGGCTTGTCTGCTCCCGGCATCCGCTTACAGAC

AAGCTGTGACCGTCTCCGGGAGCTGCATGTGTCAGAGGTTTTCACCGTCATCACCGAAAC

GCGCGAGGCAGCTGCGGTAAAGCTCATCAGCGTGGTCGTGAAGCGATTCACAGATGTCTG

CCTGTTCATCCGCGTCCAGCTCGTTGAGTTTCTCCAGAAGCGTTAATGTCTGGCTTCTGA

TAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTGTTTGGTCACTGATGCCTCCGTGTAAG

GGGGATTTCTGTTCATGGGGGTAATGATACCGATGAAACGAGAGAGGATGCTCACGATAC

GGGTTACTGATGATGAACATGCCCGGTTACTGGAACGTTGTGAGGGTAAACAACTGGCGG

TATGGATGCGGCGGGACCAGAGAAAAATCACTCAGGGTCAATGCCAGCGCTTCGTTAATA

CAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATCCTGCGATGCAGATCCGGAACATAA

TGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTACGAAACACGGAAACCGAAGACCA

TTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAGCAGTCGCTTCACGTTCGCTCGC

GTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCGCCAGCCTAGCCGGGTCCTCA

ACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCATGCCGGCGATAATGGCCTGCT

TCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCTTGAGCGAGGGCGTGCAAGA

TTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTCCAGCGAAAGCGGTCCTCGC

CGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTTGCATGATAAAGAAGACAG

TCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGAAGGAGCTGACTGGGTTGA

AGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGTGAGCTAACTTACATTAA

TTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGTGCCAGCTGCATTAAT

GAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCCAGGGTGGTTTTTCTT

TTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCCCTGAGAGAGTTGC

AGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTGATGGTGGTTAAC

GGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCGAGATATCCGCA

CCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCATCTGATCGTTG

GCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTTTGTTGAAAA

CCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATTGCGAGTG

AGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGGGCCCGCT

AACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGCGTACCG

TCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAAATAAC

GCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGGATAG

TTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAGGCT

TCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGCGA

GATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAACG

CCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATTC

AGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGG

TTCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAAC

GTTACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATA

CCGCGAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGA

CTCCTGCATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAG

GAATGGTGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCAT

ACCCACGCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGT

GATGTCGGCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGAT

GCGTCCGGCGTAGAGGATCGAGATCTCGATCCCGCGAAAT

[5'3' Frame 2](http://web.expasy.org/cgi-bin/translate/dna_sequences?/work/expasy/tmp/http/seqdna.15246,2)

NTTHYRGIVSG-QFPSRNNFV-L-EGDIHM**HHHHHH**SSGVDLGTENLYFQSMKKTFLIAL

VLATSLIGAENAKWDYKNKENGPHRWDKLHKDFEVCKSGKSQSPINIEHYYHTQDKADLQ

FKYAASKPKAVFFTHHTLKASFEPTNHINYRGHDYVLDNVHFHAPMEFLINNKTRPLSAH

FVHKDAKGRLLVLAIGFEEGKENPNLDPILEGIQKKQNFKEVALDAFLPKSINYYHFNGS

LTAPPCTEGVAWFVIEEPLEVSAKQLAEIKKRMKNSPNQRPVQPDYNTVIIKSSAKTR-Q

-RWIRIRIRAPSTSLRPHSSTTTTTTEIRLLTKPERKLSWLLPPLSNN-HNPLGPLNGS-

GVFC-KEELYPDWRMGRAL-RRIKRGGCGGYAQRDRYTCQRPSARSFRFLPFLSRHVRRL

SPSSSKSGAPFRVPI-CFTAPRPQKT-LG-WFT-WAIALIDGFSPFDVGVHVL--WTLVP

NWNNTQPYLGLFF-FIRDFADFGLLVKK-ADLTKI-REF-QNINVYNFRWHFSGKCARNP

YLFIFLNTFKYVSAHELILRKTHRASNETAIYSYQDYQYHIFEKAVSVMKEKTHRGSSIG

WQDPGIGLRFRLVQHQYNLLISPRQK-GYQVRNHHE-RLNPVRMAKVYAFLSRLVQQASH

YARHQNHSHQPNRYSFVIAPERDEIRDRC-KDNYKQESNATGAGTLPAHQQYFHLNQDIL

LIPGMLFSRGSQW-VTMHHQEYG-NA-WSEEA-IPSASLV-PSHL-HHWQRYLCHVSETT

LAHRASHTIDRLSHLIARHYREPIYTHINQHPCWNLIAA-SKTFPVEYGS-HPLYYCLCK

QTVLLFMTKIP-REFSFH-ASDPVEKIKGSS-DPFFLRVICCLQTKKPPLPAVVCLPDQE

LPTLFPKVTGFSRAQIPNTVLLV-P-LGHHFKNSVAPPTYLALLILLPVAAASGDKSCLT

GLDSRR-LPDKAQRSG-TGGSCTQPSLERTTYTELRYLQREL-ESATLPEGRKADRYPVS

GRVGTGERTRELPGGNAWYLYSPVGFRHL-LERRFL-CSSGGRSLWKNASNAAFLRFLAF

CWPFAHMFFPALSPDSVDNRITAFE-ADTARRSRTTERSESVSEEAEERLMRYFLLTHLC

GISHRIYGALSVQSALMPHS-ASIHSAIAT-LGHGCAPTPANTR-RALTGLSAPGIRLQT

SCDRLRELHVSEVFTVITETREAAAVKLISVVVKRFTDVCLFIRVQLVEFLQKR-CLASD

KAGHVKGGFFLFGH-CLRVRGISVHGGNDTDETREDAHDTGY---TCPVTGTL-G-TTGG

MDAAGPEKNHSGSMPALR-YRCRCSTG-PAASCDADPEHNGAGR-LPRFQTLRNTETEDH

SCCCSGRRRFAAAVASRSLAYR-FILLTSKATPPA-PGPQRQEHDHAHPWGRHAGDNGLL

LAETFGGGTSDEGLSEGVQDSEYRKRQADHRRAPAKAVLAENDPERCRHLSYELHDKEDS

HKCGDDSHAPRPPEGADWVEGSQGHRSRSRCLMSELTYINCVALTARFPVGKPVVPAALM

NRPTRGERRFAYWAPGWFFFSPVRRATADCPSPPGPERVAASGPRWFAPAGENPV-WWLT

AGYNMSCLRYRRIPLPRYPHQRAARTR-WRALRPAPSDRWQPASQWERCPHSAFAWFVEN

RTWHSSRLPVPLSAEFDCE-DIYASQPDADAPRQNLMGPLTARFAGDPMRPDAPRPVAYR

LHGRK-YC-WVSGQRHQEITPEH-CRQLPQQWHPGHPADS--SAH-RVAREDCAPPLYRL

RRRFVLPSTPPRWHPVDRREI-SPRQFATARAGPDWRWQRQSATTVCPPVVVPRGWECNS

APPSPLPLFPAFSQKRGWPGSPRGKRSDKRHRHTLRHRITLLVSHSPP-IDSLPGAIMPY

RERFCAIRWCPGSRRSPLCDSCIRKQPSSRLRPLSTAAARNGACKEMAPNSPPATGPATI

PTPKQALMSPKWRARSSPSVMSAI-APATAPVAPVMPATMRPA-RIEISIPRN